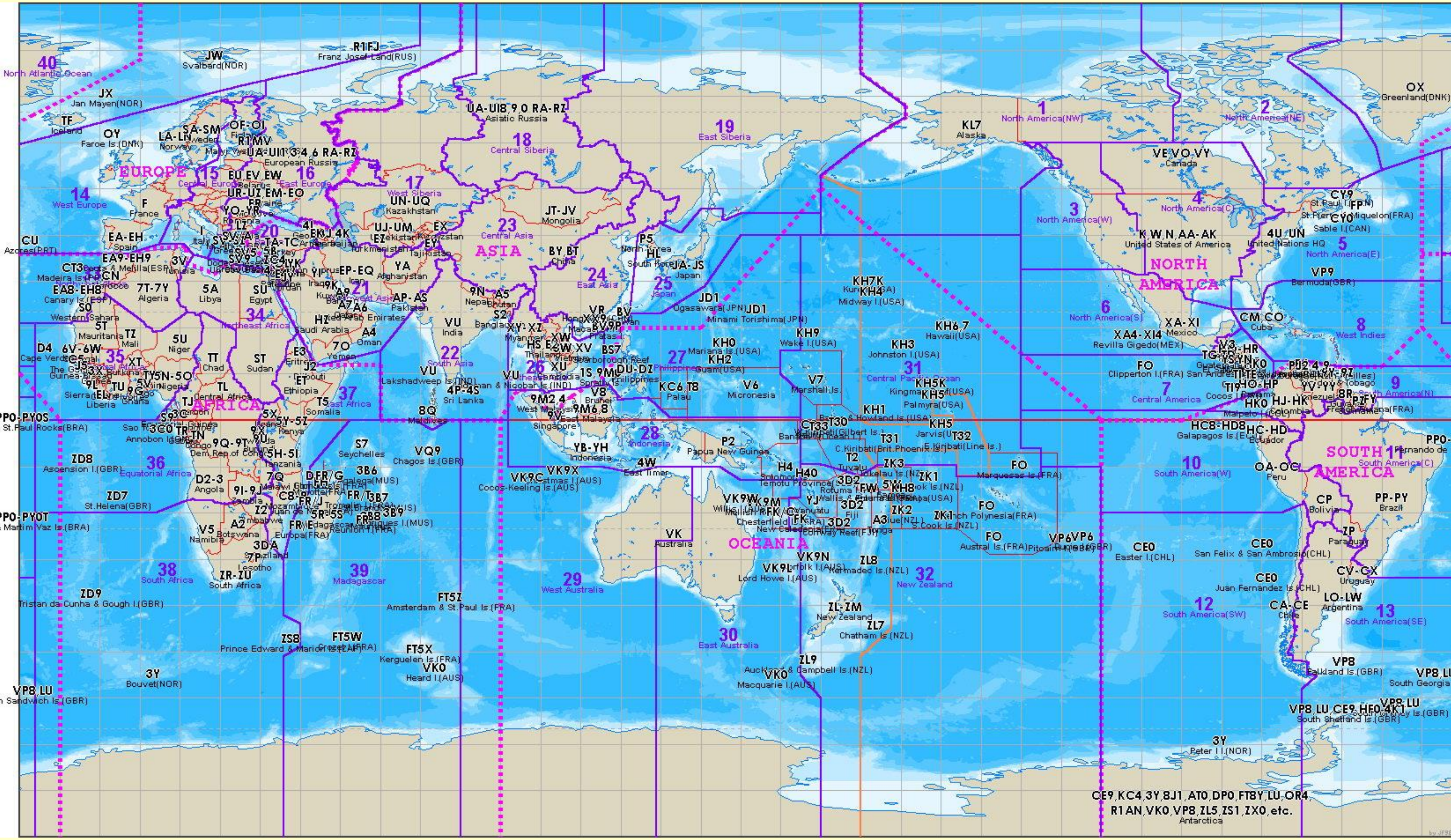
Les débuts en HF

Bien oui ! C’est Michel … VE2SIG


VE2VEI
QUEBEC, CANADA
CQ - 05 / ITU - 04
Formation 1977
Certificat base avril 2006
Supérieure avril 2008

Indicatifs radio-amateurs



Combien ne communique pas sur HF ? Raison ?

- Manque d'informations
- Localisation du domicile
- Moyen financier
- La langue parlée
- ????

Les buts de la radio-amateur ?

- Communications d’urgence
- Aider
- - Expérimenter
  - Communications satellites
  - Aprs
  - D-Star
- Bricoler
- Inventer
- Fabriquer (à moindre coût) ce qui est disponible sur le marché

Fréquences HF ?

- Spectre des fréquences de RAC
  (Radio-Amateurs du Canada)

HF Crib Sheet

Canada's National Amateur Radio Society

"We're ALL about Amateur Radio!"
"Tous ensemble pour la radioamateur!"

Home | Français | RAC Management & Services | Band Plans | HF Band Plans

HF BAND PLAN
Courtesy of John VA3JSL

160 M - bandwidth 6 kHz		
1.800	1.820	CW
1.820	1.830	Digital
1 830	1.840	DX
1.840	2.000	SSB +

80M - bandwidth 6 kHz LSB (SSB > 3.728 US > 3.753)		
3.500	3.580	CW
3.580	3.620	Digital
3.620	3.635	Pack/Digital
3.635	3.725	CW
3.725	3.790	SSB
3.790	3.800	SSB DX
3.800	4.000	SSB +

40M - bandwidth 6 kHz		
CW		
7.035		
7.040	7.050	Intnl packet
7.050	7.100	SSB
7.100	7.120	Packet R# 2
7.120	7.150	CW
7.150	7.300	SSB +

30M - bandwidth 1 kHz Primary Canada, no interference elsewhere		
10.100	10.130	CW
10.130	10.140	Digital
10.140	10.150	Packet

20M - bandwidth 6 kHz		
14.000	14.070	CW
14.070	14.095	Digital

17M - bandwidth 6 kHz		
18.068	18.100	CW
18.100	18.105	Digital
18.105	18.110	Packet
18.110	18.168	SSB +

15M - bandwidth 6 kHz		
21.000	21.070	CW
21.070	21.090	Digital
21.090	21.125	Packet
21.100	21.150	CW SSB
21.150	21.335	SSB +
21.335	21.345	SSTV
21.345	21.450	SSB +

12M - bandwidth 6 kHz		
24.890	24.930	CW
24.920	24.925	Digital
24.925	24.930	Packet
24.930	24.990	SSB +

10M - bandwidth 20 kHz		
28.000	28.200	CW
28.070	28.120	Digital
28.120	28.190	Packet
28.190	28.200	Beacons
28.200	29.300	SSB
29.300	29.510	Satellite
29.510	29.700	SSB, FM +

30M - bandwidth 1 kHz Primary Canada, no interference elsewhere		
10.100	10.130	CW
10.130	10.140	Digital
10.140	10.150	Packet

10M - bandwidth 20 kHz		
28.000	28.200	CW
28.070	28.120	Digital
28.120	28.190	Packet
28.190	28.200	Beacons
28.200	29.300	SSB
29.300	29.510	Satellite
29.510	29.700	SSB, FM +

20M - bandwidth 6 kHz		
14.000	14.070	CW
14.070	14.095	Digital
14.095	14.099	Packet
14.100		Beacons
14.101	14.112	CW SSB Packet
14.112	14.350	SSB
14.225	14.235	SSTV

Les modes utilisés

- AM
- CW
- SSB
- Modes Digitaux
  - RTTY, PSK31, Olivia …

L'indispensable !

- Transmetteur
- Synthonisateur d'antenne si non intégré
- Indicateur TOS et puissance
- Charge fictive
- Antenne
- Options
  - Logbook
  - Ordinateur
  - etc.

L’équipement ‘Hi-Tech
(‘sky is the limit’)

– Facilité d’utilisation (pas de ‘tuning’)
– Synthonisateur d’antenne intégré
– DSP (Digital Signal Processing)
– Toutes les options imaginables

Icom IC-746 Pro II

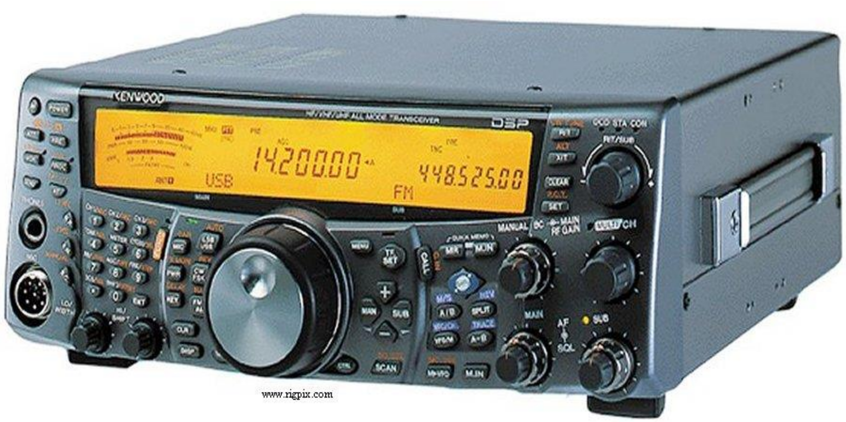
Icom IC-7000

Yaesu FT-897

Yaesu FT-2000

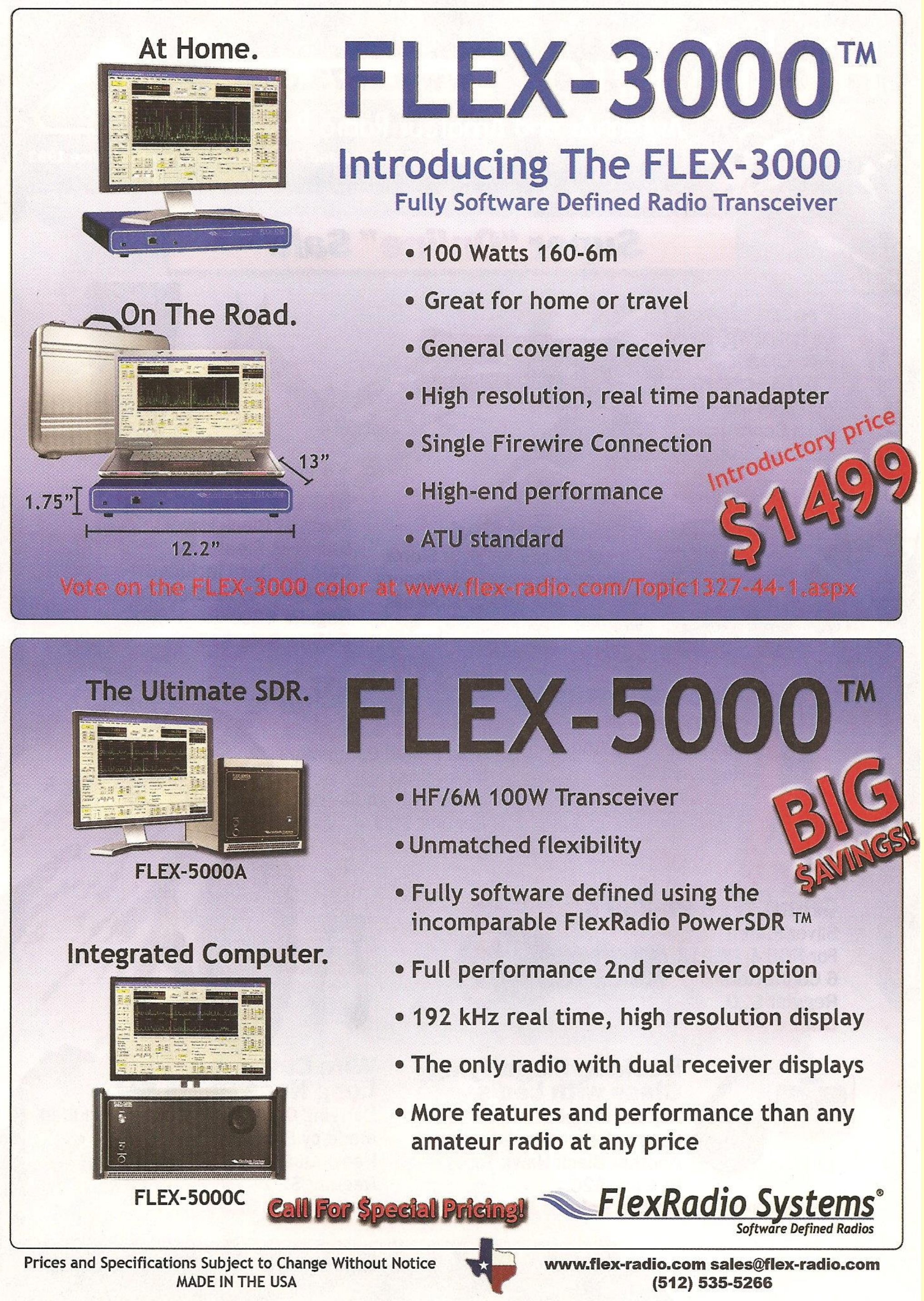
Kenwood TS-480

Kenwood TS-2000



Le nouveau FLEX

SDR
(Software Defined
Radio)

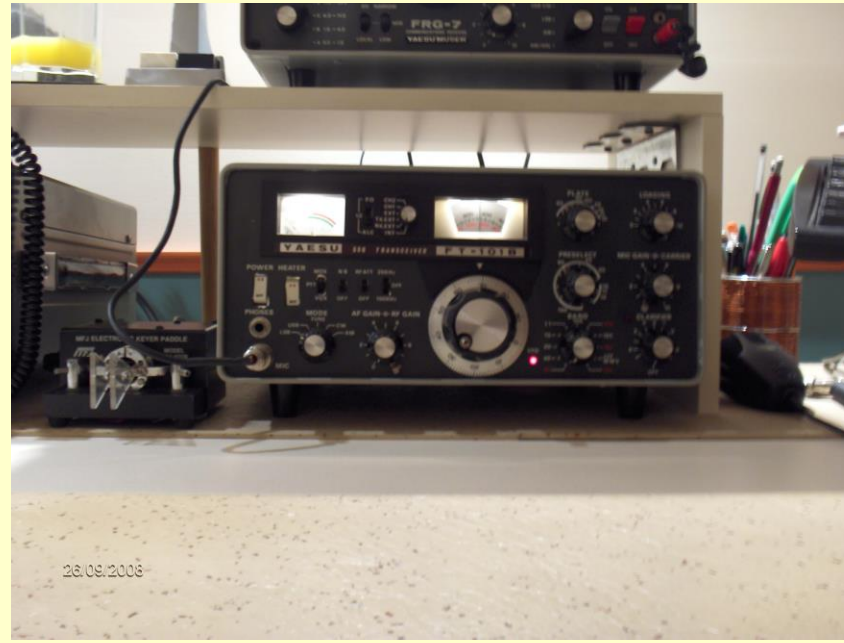


L’équipement ‘de petite fortune’

(avoir d’autres priorités)

– Modèles hybrides
– Le prix bas
– Appareil à ‘tuner’
– Utilisation plus technique
– Les beautés du passé !!!


KENWOOD
VFO-820
26/09/2008


FRG-7
YAESU
FT-101B
26.09.2008


YAESU SSB TRANSCEIVER DIGITAL FT-501
MIC GAIN
CARRIER
CALIB
LOAD PLATE
PRESELECTOR
14.219.8
MHz
KHz
PO
IC
ALC
NB
CLAR
MOX
PTT
VOX
AGC
POWER
N-SSB-R
TUNE
CW
PHONES
RF GAIN AF GAIN
MIC
BAND
02.09.2008


YAESU FT200
11/04/2008 18:15

Kenwood TS-450S

Antennes

- Beam
- Yagi
- Quad

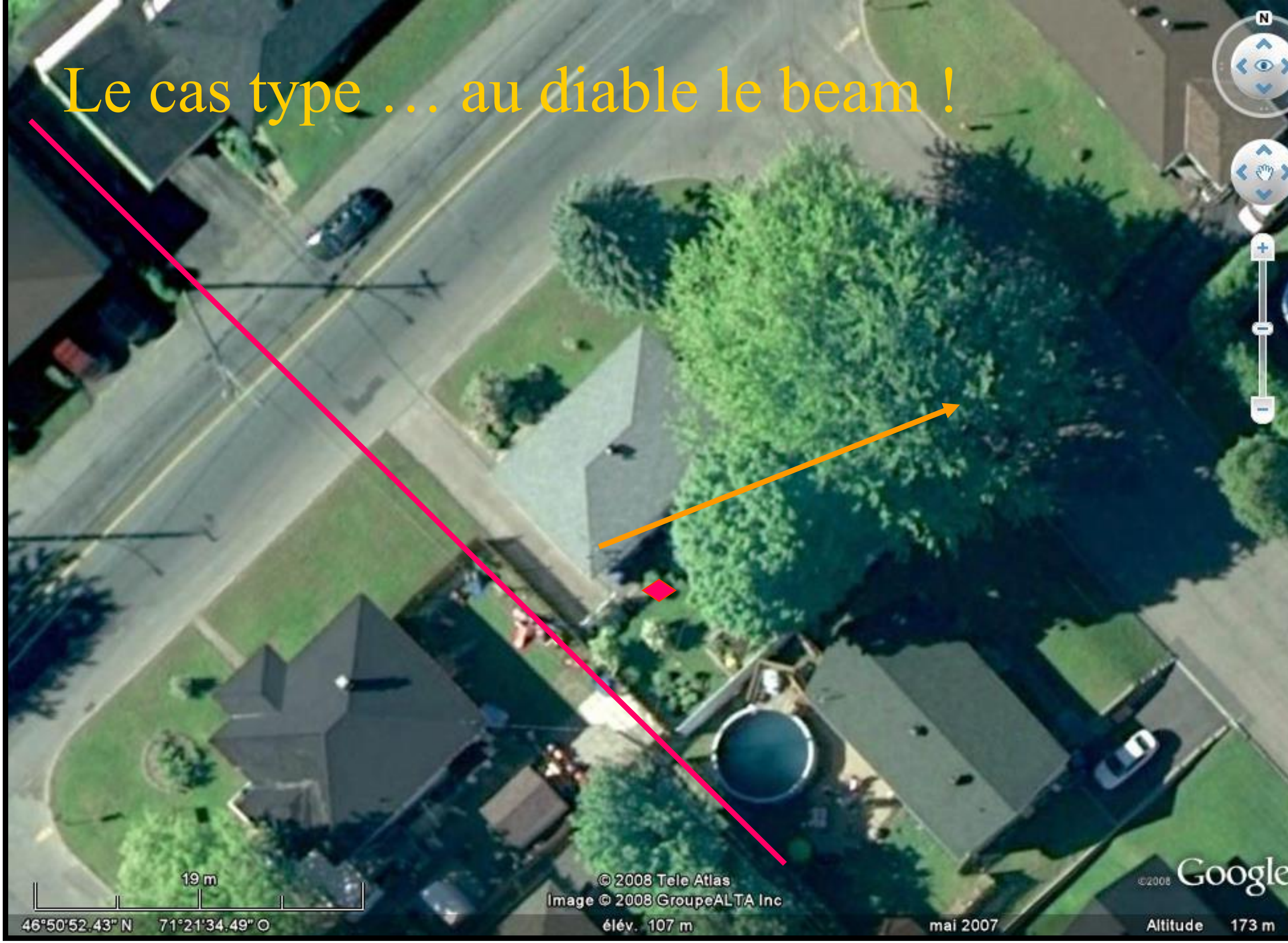
- Verticale ???

- Dipôle mono-bande
- Dipôle multi-bandes

- G5RV
- DX-CC

Tout ce que vous pouvez imaginer !

Le cas type … au diable le beam !




Fil 64’ + balun 1:1
26/09/2008

Verticale Hy-Gain AV-18AS

(usagée comme neuve !
… de VE2SIG)

Ce qu'on retrouve sur HF …

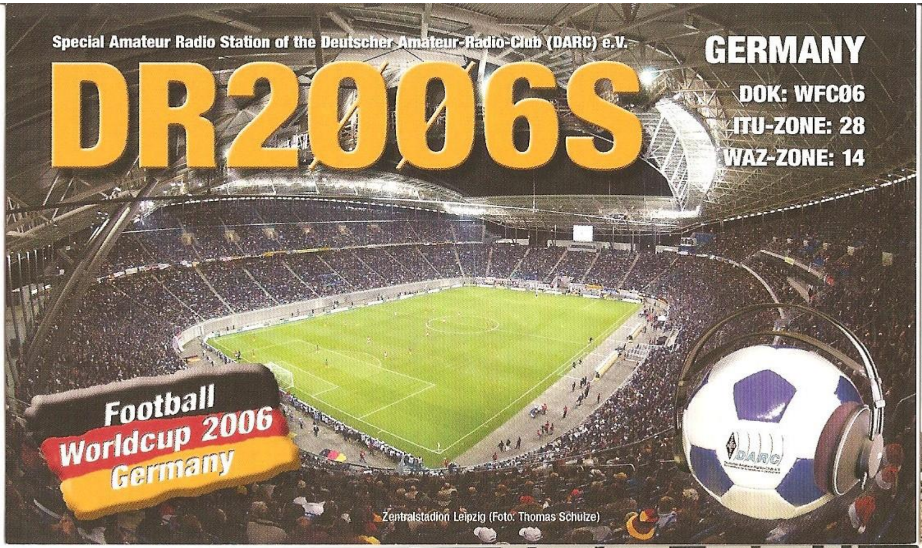
- Appels CQ DX
  - Établir des contacts
  - Accumulation de contacts pour le logbook
  - Vérifier les possibilités de son installation
- Appels CQ Contest (concours)
  - Concours de l'ARRL
  - Autres concours
    - Ressources Internet pour identification
    - Importance du logbook
- Réseaux 80M / 20M

Les utilitaires …

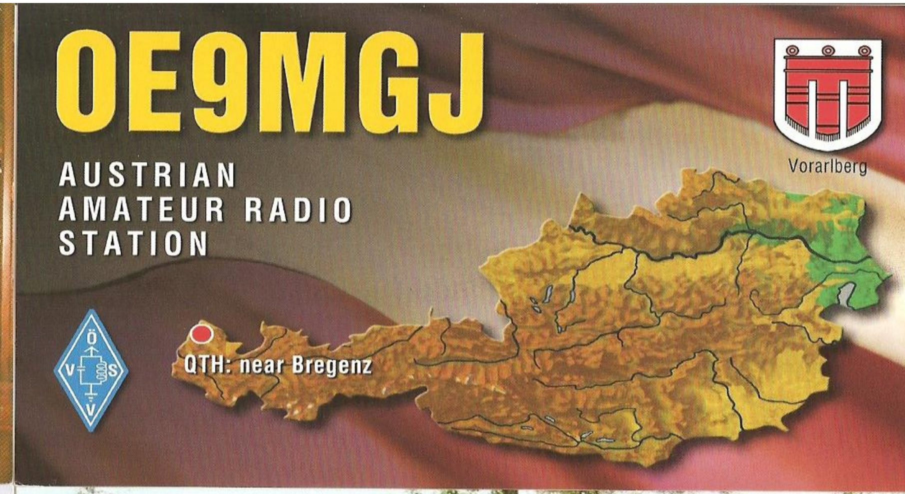
- DX-Atlas
- Ham Map
- Les ‘info barres’
- Logbook ‘Logger32’
- Décodeur MultiPsk

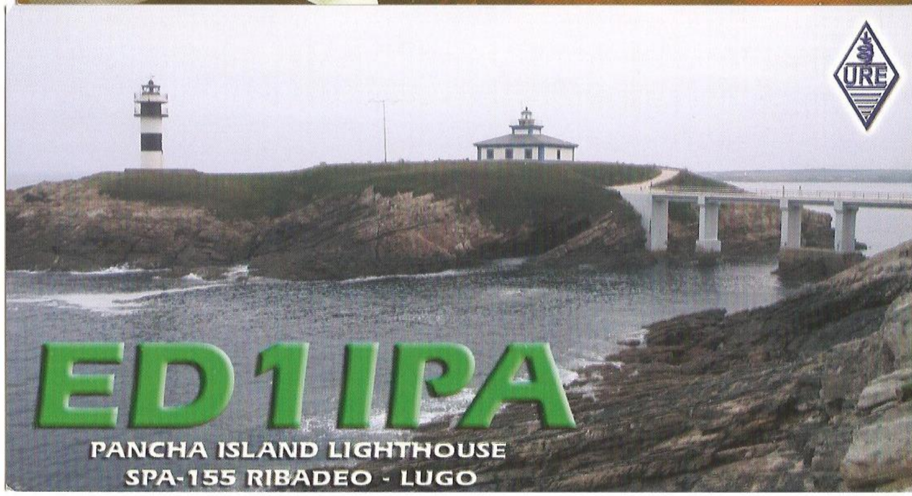
Les + du HF

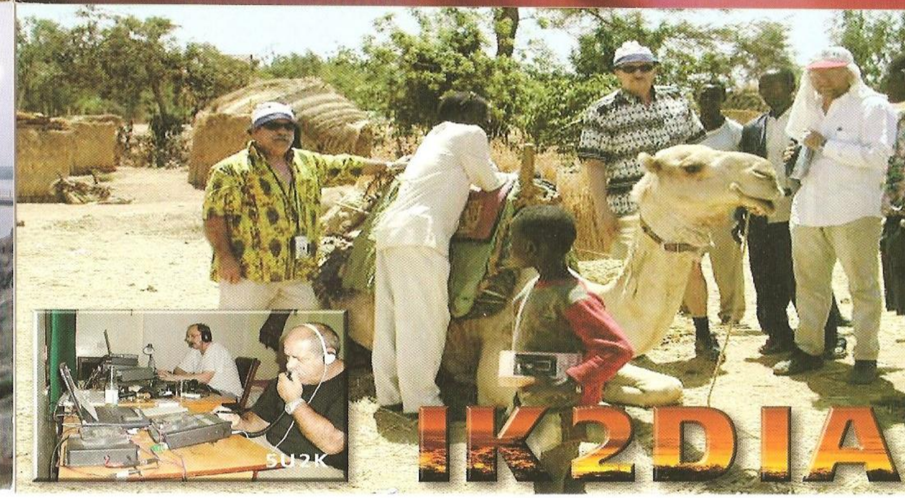
- Contact ‘réel ’
  - Technique
  - En fonction de conditions externes
  - Imprévisible
  - Utilisation de ses connaissances
  - Épanouissement personnel et culturel
  - Cartes QSL



Dl0-DR Allemagne F5 France OZ2 Danemark







Hk3 Colombie OE9 Autria ED1 Ireland IK2 Italie

RÉCRÉATIF

ET

CULTUREL

Citation d'un autre radio-amateur …

Choses à ne pas faire …

- 'Tuning on air'
- Répondre sans connaître les indicatifs de l'autre station
  - Voir les règlements d'Industrie Canada
- Utiliser la puissance maximum si non nécessaire
- Ré-inventer l'alphabet phonétique international

- **<u>Imiter 50% des radio-amateurs Américains</u>**

Les – du HF

- ‘you are five by nine’
- La ‘cacophonie’
- Peu de contacts à développement
- Les ‘malentendants’
- …

Bricolage hivernal…

Antenne HF 5 bandes

Pour synthonisateur automatique ou manuel

W1DBM spent his summer designing and testing two-band vertical antennas via his computer. This summer we can enjoy the fruits of that labor plus get some time in on our computers.

Designing A Two-Band Loaded Vertical Antenna

BY PHILIP S. RAND*, W1DBM

I have used a two-band vertical phased array quite successfully for the past few years. This antenna consists of four 20 meter verticals with a 40 meter mobile resonator mounted on the top of each element. The idea occurred to me that it should be possible to redesign this antenna for use on other frequencies and for other purposes such as mobile whips, travel-trailer antennas, or low-frequency DX verticals.

After considerable researching of engineering handbooks and back issues of amateur magazines, in the September 1974 issue of *QST* I found an article entitled "Off-Center-Loaded Dipole Antennas" by Jerry Hall, K1PLP. A ¼-wave vertical, of course, is one half of a dipole. Therefore, all that would be necessary is to cut the overall length in half and wind only one loading coil. It was worth a try. However, the gigantic mathematical equation in this article (fig. 1) almost frightened me away. Since I had a computer, though, I figured if I could get the formula into a workable program I would be home free.

$$L_{\mu H} = \frac{10^6}{68\pi^2 f^2}\left\{ \frac{\left[ln \dfrac{24\left(\frac{234}{f} - B\right)}{D} - 1 \right]\left[\left(1 - \frac{fB}{234}\right)^2 - 1 \right]}{\frac{234}{f} - B} - \frac{\left[ln \dfrac{24\left(\frac{A}{2} - B\right)}{D} - 1 \right]\left[\left(\dfrac{\frac{fA}{2} - fB}{234}\right)^2 - 1 \right]}{\frac{A}{2} - B} \right\}$$

where

$L_{\mu H}$ = inductance required for resonance
ln = natural log
f = frequency, megahertz
A = overall antenna length, feet
B = distance from center to each loading coil, feet
D = diameter of radiator, inches

Fig. 1– The program formula from Jerry Hall's article "Off-Center-Loaded Dipole Antennas," which appeared in QST, *September 1974.*

Another article was found in *CQ* magazine, December 1981 by Dick Sander, K5QY, entitled "A Computer-Designed Loaded Dipole Antenna." This article lists a program for an Apple II computer that puts Jerry Hall's formula into a workable form, and some useful ideas were obtained from it.

Jerry's article describes the design of a dipole that is considerably shorter than normal (you select the length that you have available). It then calculates the necessary inductance for a pair of loading coils to make it resonate at the desired frequency. You must select the distance, "B," from the center insulator to each loading coil. Considering one half of the dipole, if you choose "B" as ¼ wave at a higher frequency, you will have a two-band, ¼-wave vertical antenna.

Fig. 2 shows a diagram of the loaded vertical. Note that the overall height, "H," resonates at a low frequency, while the length below the loading coil resonates at a higher frequency. This design requires that the overall height be less than ¼ wavelength at the lower frequency, and that the part below the loading coil be ¼ wavelength at the higher frequency. The overall length, of course, must be longer than a ¼ wave at the higher frequency. The loading coil must have enough inductance so that it will act like an RFC on the higher frequency and isolate the lower part of the antenna, while acting like a loading coil to resonate the entire antenna at the lower frequency. A good radial ground system will be necessary under the antenna for best results.

The Equation

The equation in *QST* is rather cumbersome to handle in its present form (see fig. 1). It is much easier to enter into the computer if you first divide it algebraically into several logical sections, calculating each separately and then recombining them later. Also, two parts of the equation are each used twice, so they are also calculated separately. Their values have been assigned to the variables "DD" and "GG." "F" is the lower frequency. "F2" has been added as the higher frequency. "F2" is used to determine the length "B" in fig. 2 automatically (B = 246 * K1 / F2 where K1 = K + .04). "K" is calculated from the ratio of the length to the diameter of the total antenna, while the ".04" was derived experimentally to compensate for the inductance of the loading coil that replaces the capacity of an end insulator. "D" is the diameter of the radiating element in inches. The computer program has a wire table built in so that the uH of the loading coil will be correct for any diameter of radiating element. You may enter either the diameter of the antenna or the wire gauge. You can therefore use this program to design a two-band ground-plane antenna with a large-diameter radiator as well as a wire vertical hung from a tree or a wooden pole.

The *QST* article only calculated the inductance in uH of the loading coils. Of course, you must wind these coils (see fig. 3). It is necessary, therefore, to figure out the number of turns, wire size, length, etc. To determine the physical size of a single-layer air-wound coil where "EQ" equals inductance, the following formula

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Eureka! A trap dipole for ANY two HF bands that can be shrunk to fit a small space[1]!

The ES2B (Electrically Shortened Two-Band) Dipole

BY GEORGE MURPHY,* VE3ERP

This is more of an idea provoker than a construction article, because the ES2B dipole is an experimental antenna custom designed by *you* (no knowledge of, or experience in, antenna design required!) and therefore can only be proven by designing and building one.

Before getting all excited about the prospect of an ES2B dipole gaining you entry into Antenna Nirvana, be aware that the ES2B (like all shortened dipoles) may not be as efficient as a full-size half-wave dipole. However, be an optimist. Look at its performance on each band not as being X% *worse* than a full-size isotropic[2] dipole, but as being Y% *better* than one of those short noodles mounted on the roof or trunk lid of a plastic-body car, or installed in an attic or on an apartment balcony railing. Somewhere between the isotropic dipole and a noodle, an ES2B antenna in a restricted space can be a viable alternative to no antenna at all!

Jerry Hall, K1TD,[3] developed an elegant equation (fig. 1) for physically shortening a dipole while substantially maintaining its electrical properties by adding loading coils somewhere along each leg. This equation is the conceptual core of the ES2B dipole design. For those of us (including me) who are frightened by complex equations, fig. 2a is the K1TD equation translated into a simple BASIC computer program.

There is nothing mysterious about an ES2B dipole. It is simply a trap dipole with its lower frequency elements physically shortened to fit a small space, maintaining the electrical properties of its lower operating frequency by attaching an additional loading coil *L2* to trap coil *L1* (see fig. 3d). Together *L1* and *L2* function as an inductive-load *L3* to physically shorten the antenna.

Evolution of the ES2B Antenna

Fig. 3a is a half-wave dipole with a physical length (in feet) of 468/(freq. in MHz). Add a couple of loading coils, *L2*, and you have an electrically shortened dipole (fig. 3b) somewhat shorter than 468/(freq. in MHz) feet.

A trap dipole (fig. 3c) has a capacitor *C1* in parallel with a coil *L1* on each leg, forming a wave trap tuned to the higher

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e-mail: <ve3erp@encode.com>

$$L_{uH} = \frac{10^6}{68\pi^2 f^2}\left(\frac{\left(\log_n \frac{24\left(\frac{234}{f}-B\right)}{D}-1\right)\left(\left(1-\frac{fB}{234}\right)^2-1\right)}{\frac{234}{f}-B} - \frac{\left(\log_n \frac{24\left(\frac{A}{2}-B\right)}{D}-1\right)\left(\left(\frac{\frac{fA}{2}-fB}{234}\right)^2-1\right)}{\frac{A}{2}-B}\right)$$

Where:

L_{uH}	=	inductance (uH) required for resonance
$\log_n$	=	natural log
f	=	frequency (MHz)
A	=	overall antenna length (feet)
B	=	distance (feet) from center to each loading coil
D	=	diameter (inches) of radiator

Fig. 1– K1TD's equation for physically shortening a dipole while substantially maintaining its electrical properties by adding loading coils somewhere along each leg.

• • •


HI-Q
ALUN
Ratio
VGE
Box 21305
Ohio 44121
PRIX
24/09/2008


DX-CC (maison)
24/09/2008

Bon HF !